

## Lower Yakima River TMDL

Washington Department of Ecology

Approval Date: November 1998

**Pollutants:** Turbidity and DDT

**Sources:** The lower Yakima River basin is located in south-central Washington State and is one of the most intensively irrigated and agriculturally diverse areas in the United States. Suspended sediment and persistent pesticide loads from irrigated agricultural areas have long been recognized as serious impairments to water quality. Fish in the lower Yakima River have one of the highest concentrations of DDT in the country (Rinella et al., 1993).

### **TMDL Recommendations:**

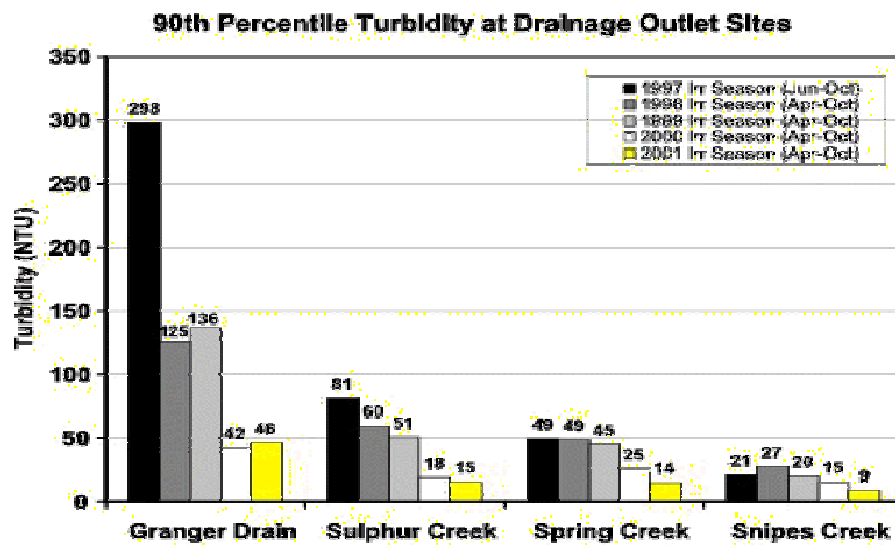
The TMDL sets reduction targets for turbidity and total suspended sediment (TSS) for the mainstem Yakima River and the mouths of tributaries and return drains. The TMDL commits to re-evaluation work, further target development, and sets numeric reductions goals for years 5, 10, 15 and 20. Aquatic health criteria should be met in 15 years (2012) and DDT human health criteria should be met at year 20 (2017).

### **Environmental Impact:**

At 3 of the return drains, the 5 year turbidity goals were met two years early. Granger Drain has reduced its turbidity by 85% at year 4 (see graph below).

### **How Did Environmental Change Happen?:**

The Roza and Sunnyside Irrigation Districts took on the task of getting farmers to meet the TMDL recommendations with a combination of education, enforcement and cooperation. The Districts warned growers about the environmental and economic consequences of not meeting the TMDL targets, and followed up with a policy of reducing water supply to irrigators who sent highly turbid water back into the river. The Districts secured \$10 million in low-interest loans to help growers make the changes necessary to clean up water (e.g. purchase and install more efficient sprinkler systems).



**Cascade Reservoir TMDL**  
Idaho Department of Environmental Quality  
Approval Date: May 1996

**Pollutants:** Phosphorous, Dissolved Oxygen (DO), pH

**Sources.** Excess nutrients delivered to Cascade Reservoir by the North Fork Payette River and other tributaries originate from both point and non-point sources. Point sources include the McCall wastewater treatment plant and a fish hatchery. Non-point sources of sediment determined to be a major source of phosphorus include grazing lands, agriculture, logging roads and stormwater.

**TMDL Recommendations.** Interim lake targets of 0.0025 mg/l phosphorous and 10 ug/l chlorophyll a were established, requiring a 37% reduction in phosphorus loading. To achieve this reduction, a 30% reduction from nonpoint sources in each tributary was specified, and a 100% reduction (zero wasteload allocation) was established for the McCall wastewater treatment plant. A zero wasteload allocation was given to the wastewater treatment plant because it was the single largest contributor of soluble phosphorus in the watershed.

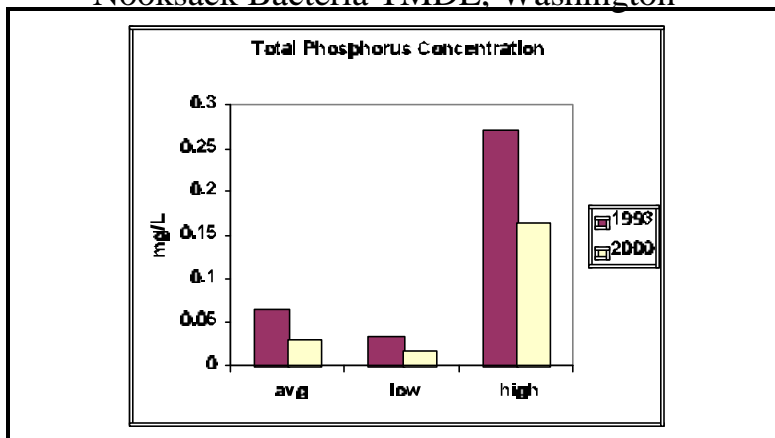
**Environmental Improvements.** Average total phosphorus concentrations in the reservoir have decreased 50% (see graph below) between 1993 and 2000. The wastewater storage lagoon at McCall began operation late in 2001, and is expected to further decrease phosphorus concentrations in the Reservoir.

**How did Environmental Change Happen?**

The need to develop a TMDL drove the formation of the Cascade Reservoir Coordinating Council (CC). Through their participation in the TMDL, the CC gained ownership of the TMDL, and three subgroups of the CC developed an Implementation Plan after TMDL approval. Implementation of specific best management practices identified in the Implementation Plan has reduced the phosphorus input from forestry, agricultural, and stormwater.

In response to the zero discharge wasteload allocation, the City of McCall, in coordination with local ranchers and farmers, moved to land application of their treated effluent, which is mixed with irrigation water and applied to pasture and crop land during the summer irrigation season. In addition to improving water quality in the reservoir, this project also increased instream flows, reduced ditch erosion, and reduced irrigation-induced erosion.

**Nooksack Bacteria TMDL, Washington**



**Pollutants.** Fecal Coliform.

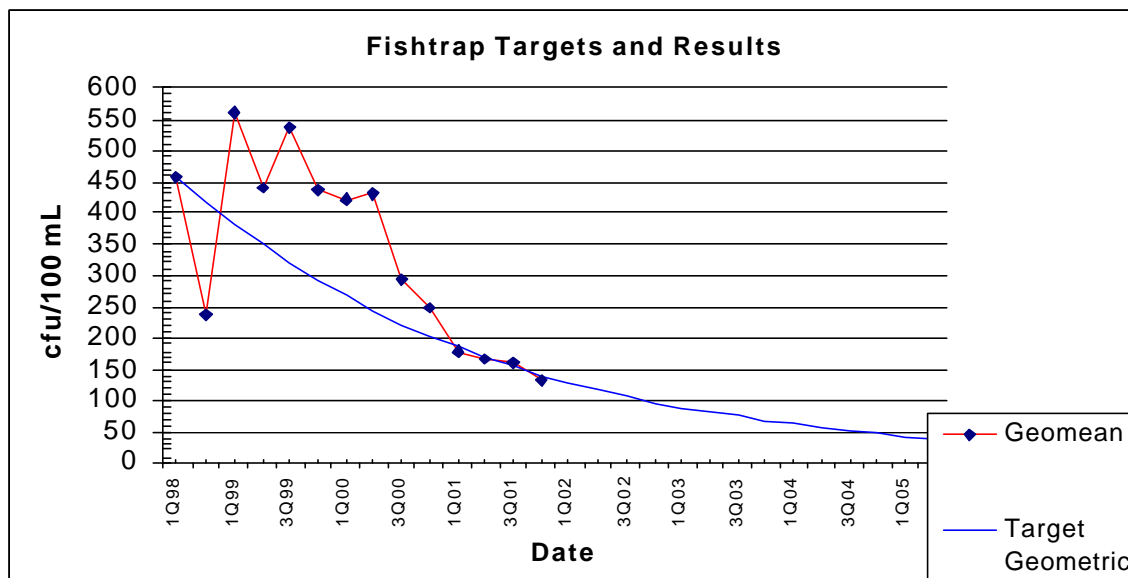
**Sources:** Dairy and livestock operations. During implementation of the TMDL, failing on-site septic systems were also identified as a pollutant source. Fecal coliform levels in the Nooksack have resulted in the closure of shellfish beds in Portage Bay on the Lummi Reservation.

**TMDL Recommendations.** The TMDL established in-stream fecal coliform targets for the Nooksack and its tributaries that recommended up to 98% reduction in fecal coliform loading. The goal of the TMDL is to meet instream targets by 2005.

**Environmental Improvements.** Since December 1998, four water quality stations have been monitored on the Nooksack river. By the end of 2001, all four stations met the TMDL targets (2 years ahead of schedule). The improvements in Fishtrap Creek are illustrated in the table below. Fishtrap Creek was responsible for 18.8 % of the fecal coliform in the river, while it contributed only 2.2 percent of the flow.

**How did Environmental Change Happen?**

Establishing a 5-year target was instrumental in targeting resources for implementation, and motivating community stakeholders. Dairy inspectors used TMDL implementation monitoring data to prioritize their inspections. Data show substantial declines in bacteria levels following the inspections, and those dairy operations found to be contributing to water quality problems were referred to the Whatcom County Conservation District for technical assistance. In areas where high bacteria counts persisted during low rainfall events and in the absence of discernable agricultural sources, samples were collected to identify failing on-site septic systems. Failing septic systems were identified and remedied.



**Mid-Snake River TMDL, Idaho**  
Idaho Department of Environmental Quality  
Approved: April 25, 1997

**Pollutants:** Phosphorus

**Sources:** This 94 mile stretch of the Snake River is one of the most highly developed river reaches in the state of Idaho, and includes 5 hydroelectric impoundments. Nutrient sources include irrigation return flows, confined animal feeding operation runoff, hatchery effluent and municipal point source discharge.

**TMDL Recommendations:** The Idaho Department of Environmental Quality worked with representatives from all point and non-point source industries to develop the following phosphorus reductions:

<u>Point Sources</u>	<u>Reduction Needed</u>
Aquaculture	40%
Food Processors	20%
Municipalities	34%
<u>Non-point Sources</u>	
Confined Feeding	100%
Irrigated Agriculture	10%

**Environmental Impact:**

Implementation of the phosphorus TMDL will occur in two phases over 10 years. Phosphorus loading for the aquaculture industry has been reduced 63% in the first phase.

**What is Successful about this TMDL?**

Historically, Idaho NPDES permits have not included phosphorus limits because the nutrient standard is narrative; development of an appropriate nutrient standard requires a watershed based analysis that is typically beyond the scope of a NPDES permit. The comprehensive nature of the TMDL watershed management plan, however, allowed for watershed wide source assessment and modeling, establishing the basis for a numeric phosphorous target for the mid-Snake.

Initially State TMDL staff asked major industries to work together to determine the most appropriate distribution of phosphorus reductions among industries, which they did. Within the aquaculture industry, however, distributing specific wasteload allocations amongst the 60+ facilities was contentious. State staff gave industry a time limit in which to agree on allocations, and were prepared to impose an allocation scheme developed by EPA if industry did not come up with their own. In the end, aquaculturists successfully developed allocations for the large facilities which contributed a majority of the loading, and a plan to collect data and establish allocations within three years for small facilities. Wasteload allocations from the mid-Snake TMDL have been incorporated in the NPDES permits for over 70 facilities, including the following:

City of Buhl WWTP	City of Twin Falls WWTP
City of Burley WWTP	Ore Ida Foods
City of Heyburn WWTP	J.R. Simplot Foods

City of Hansen WWTP  
Jerome Cheese  
City of Jerome WWTP

Aquaculture General Permit (covering 61  
facilities)  
University of Idaho Aquaculture Facility

Recently, six major impounds on the river have gone through relicensing. Each has identified the Mid-Snake TMDL as the driver for off-site remediation project and each is participating in the Mid-Snake Watershed Advisory Group.

**Little River TMDL, Oregon**  
Oregon Department of Environmental Quality  
Approval Date: January 2002

**Pollutants:** Temperature, sediment, pH

**Sources:** Timber harvest. The upper half of the watershed contains lands managed by the US Forest Service, while the lower watershed is of mixed private and federal ownership, with the federal lands being managed by the Bureau of Land Management (BLM).

**TMDL Recommendations:**

The TMDL recommends that temperature be reduced to levels which occur under natural site potential conditions (0% loading from anthropogenic activities, including forest harvest). Targets are expressed as percent effective shade so that attainment can be easily monitored by land management agencies. The TMDL also recommends that sediment load (tons/year) be reduced to 70% of controllable sediment inputs. Instream and hillslope targets are established for purposes of implementation and monitoring.

**What is Successful about this TMDL?**

The Oregon DEQ developed the TMDL in close cooperation with the US Forest Service and BLM. The USFS and BLM not only provided an extensive amount of data for the TMDL but also provided their expertise towards analyzing temperature and sediment loadings and the potential reductions which could be expected. Without the assistance of USFS and BLM staff, much of the data and analysis found in the final TMDL would not have occurred and the final TMDL would have been of a significantly lower quality.

Both the BLM and USFS have expressed to EPA the value they see in having an approved TMDL for the watershed. The USFS hydrologist for the Umpqua National Forest expressed in a recent email: "The official EPA approval of the Little River Total Maximum Daily Load means ... better water quality in Little River, now and in the future. We can now spend our time making good recommendations on the ground!"

## Winchester Lake TMDL, Idaho

Idaho Department of Environmental Quality

Approval Date: March 1999

**Pollutants.** Sediment, nutrients, dissolved oxygen, temperature.

**Background.** Winchester Lake is a 100 acre impoundment created by damming Lapwai Creek in 1910, and is the focal point of the Winchester Lake State Park. The mill pond reservoir and its 7,800 acre watershed are located entirely within the Nez Perce Reservation. The lake hosts a wide variety of game fish, and is one of the most popular fisheries in north central Idaho. Excessive sediment and nutrient loading, combined with elevated temperature, have led to eutrophication, depressed DO levels, and fish kills.

### **TMDL Recommendations.**

There are no point-sources of pollution in this watershed. Upper Lapwia Creek contributes 70% of the annual flow to Winchester Lake. The TMDL recommends percent reductions of phosphorus, sediment and bacteria at the mouth of Upper Lapwia. These reductions will be achieved through implementation of agricultural and grazing BMPs, and by restoring stream banks to minimize erosion.

### **What is Successful about this TMDL?**

Tri-government Memorandum of Agreement. Serious concerns were raised between Idaho and the Nez Perce Tribe over which entity had legal jurisdiction for water quality issue within the Reservation. Both parties have a desire to improve water quality, despite different views regarding legal jurisdiction, so a Memorandum of Agreement was developed among Idaho, the Nez Perce Tribe, and USEPA. The agreement specified that the three parties will set aside jurisdictional issues and work collaboratively to develop the TMDL, using Idaho water quality standards as a target.

Watershed Advisory Group. A key part of the MOA was formation of a Watershed Advisory Group (WAG). All parties recognized the importance of local landowners being involved in TMDL development. Forming a WAG provided a mechanism to educate stakeholders on water quality problems, standards and TMDLs, and allowed stakeholders to participate in developing TMDL goals and implementation. Since implementation of the TMDL is voluntary, having landowner agreement and buy-in is essential.

Numerous meetings were held with the WAG to discuss all elements of the TMDL, from water quality standards, to specific allocations for each pollutant. These were not always easy discussions, and many controversial issues arose, particularly regarding whether the water quality standards were right, and how specific allocations should be established. Nonetheless, the group emerged from the process with general agreement on the goals and allocations, and genuine enthusiasm for developing the implementation plan.

## Tualatin River Subbasin Phosphorus TMDL

Oregon Department of Environmental Quality



Originally Approved January 1994  
Revised TMDL Approved August 2001

**Pollutant.** Phosphorus

**Sources.** The Tualatin River Subbasin is located just west of Portland, Oregon. The headwaters are in forested lands in the Oregon coast range; the central portion of the subbasin is dominated by agricultural activities; while the lower third of the subbasin lies within the Portland metropolitan area. Primary sources of pollutants are the municipal wastewater treatment plant (WWTP), urban stormwater, agricultural runoff and natural phosphorus in the soils and local groundwater inputs.

**TMDL Recommendations.**

The 1994 TMDL provided allocations to the WWTP, stormwater runoff, agricultural runoff and natural background. Implementation activities focused on upgrades to the WWTP and reducing agricultural runoff. During the recent reevaluation of the TMDL, it was found the WWTP upgrades significantly reduced loads from the WWTP, leading to nearly full compliance with the pH, dissolved oxygen and chlorophyll a criteria. However, it was found that further reduction was required for urban stormwater runoff. Therefore, the 2001 TMDL focused on stormwater and refining estimates of natural background concentrations of phosphorus while providing allocations which required maintenance of the improvements previously achieved by the WWTP and agricultural community. In addition, in 2001 a temperature TMDL was developed which addressed the impacts of elevated stream temperatures on nuisance aquatic plant growth.

**Environmental Improvement:**

When Oregon initiated TMDL activities in the Tualatin River Subbasin (1987), the Tualatin River experienced large algal blooms and algal rafts throughout the summer months. These conditions led to high pH levels and depressed dissolved oxygen levels. The improvements adopted under the 1994 TMDL have significantly reduced algal blooms, and the community is once again using the river for canoeing and swimming. The last major pH violations occurred in 1995 and the dissolved oxygen criteria is being met during most summers.

**How Did Environmental Change Happen?**

The major improvements experienced to date in the Tualatin River have been a result of actions by the WWTP. Tertiary treatment was installed to remove phosphorus from the plants discharge water and instream flows have been augmented by water purchased by the agency operating the WWTP. Some additional improvements have been gained through local volunteer improvement activities.